

creased risk for introducing infectious organisms or dislodging valvular vegetations.

The clinical features are most often characterized by recurrent infections, with apparent adequate antibiotic therapy, until sudden severe cardiac decompensation occurs. Early identification of organisms is essential, but rarely does a well-documented sepsis precede the endocarditis. The appearance of a new cardiac murmur is of great therapeutic significance, but often it is not detected until late in the course of the infection, and frequently indicates impending cusp rupture. Congestive heart failure is associated with hemodynamically significant valvular regurgitation.

In contrast to findings in the adult population, an absolute as well as a relative increase in the number of children admitted to hospital with infective endocarditis is occurring. The most disturbing facts are that an antemortem diagnosis is rarely made, and there are few known survivors if infective endocarditis occurs before the age of 1 year. Therefore, early diagnosis and early adequate treatment of sepsis in young infants must be emphasized, along with continuing close observation for sufficient time to detect progression to endocarditis.

ELISA GRIEGO, MD
COLIN M. BLOOR, MD

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Laboratory Investigation of Rape

THE PRESENCE OF SPERMATOZOA and elevated levels of acid phosphatase in the vagina are considered positive indicators of the presence of semen. Semen may also be identified by a semen-specific protein in cases of no sperm and low levels of acid phosphatase. The time of deposition of the ejaculate in the vagina is based not only upon sperm motility and their morphologic survival but also on quantitative levels of acid phosphatase. The latter is particularly useful in cases involving vasectomized men. Therefore, the minimum specimens for laboratory investigation of alleged sexual assault includes a microscopic examination for presence of sperm and motility as well as a quantitative acid phosphatase. Use of the Dacron swab technique allows for speci-

men collection from the vagina as well as the oral cavity, rectum, anal canal and body surface of an adult or a child.

Pubic hair combings as well as blood and saliva for ABO antigen secretor status when combined with the swab specimens have in selected cases been used for assailant identification or exclusion. Following a complete history, the proper and timely collection of pertinent specimens with adequate preservation and documented chain of possession is a *must* in cases of alleged sexual assault.

THEODORE P. FINDLEY, MD

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Pneumoconiosis in Zoo Animals

SOME CASES of pneumoconiosis in humans suggest that atmospheric dust may play an etiologic role. To examine this possibility, animals have frequently been used as models of experimental pneumoconiosis. However, spontaneously occurring pneumoconiosis in animals is rarely reported. During the years 1956 through 1977, more than 11,000 autopsies were carried out on different species dying in the San Diego Zoo. A simple pneumoconiosis with lamellar birefringent crystals was observed in about 20 percent of the cases.

We studied 100 autopsies from 11 mammalian and 8 avian species. In mammals, mild pulmonary lesions comprised crystal-laden macrophages in alveoli and lymphatics. Interstitial fibrosis was present in 20 percent of cases. There were no nodules. In birds, dust retention produced large granulomas around tertiary bronchi without fibrosis. Mineralogic analysis using scanning and transmission electron microscopy showed most of the crystals to be silicates. About 90 percent were complex silicates with aluminum-potassium silicates comprising 70 percent of the analyzed particles. Electron and x-ray diffraction showed the silicates to be muscovite mica and its hydrothermal degradation product; that is, illite clay. This mica was also present on filtration membranes of atmospheric air samples obtained from the San Diego Zoo. The amount of dust retention

was related to an animal's age, anatomic or ecologic variances, and length of stay in the San Diego Zoo. Its semidesert atmosphere is rich in silicates which are inhaled and deposited in the lungs. Humans living in the same area may be exposed to the same risk, particularly if their occupation, such as agricultural work, makes them breathe a dustier atmosphere than other inhabitants of these areas. Since similar mica-induced lesions are found in men living in this region or the Southwest of the United States, this simple pneumoconiosis is likely to be widespread in human populations living in desert or semi-desert climates.

COLIN M. BLOOR, MD
CHRISTIAN BRAMBILLA, MD
ELIZABETH BRAMBILLA, MD
KURT BENIRSCHKE, MD

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Use of Microprocessors in Microbiology

MICROPROCESSORS are miniature computers which can be packaged into a single integrated circuit measuring only 5 mm square. Their cost has decreased due to this miniaturization (now costing \$15 to \$20 for a central processing unit) so that an entire system may be installed economically into a medical instrument. These on-board microcomputers have led to applications in medical instrumentation that extend far beyond the scope of conventional circuitry. Instruments are appearing in which quality control checks, diagnostic troubleshooting, computations and data formatting are all under the control of a microcomputer. More recently, the computer capability in such instruments is being expanded to include simplified presentation of complex clinical data. These applications are currently emerging in microbiology—a field that has traditionally not been involved with automation.

Most recently in the field of microbiology, a microprocessor controlled instrument has been developed that can automatically read a tray of microtubes and report the results as a minimum inhibitory concentration (MIC). The MIC provides much more information than the traditional Kirby-Bauer disk diffusion method because it allows physicians to consider susceptibility in terms of a variety of antibiotic doses and sites

of the body. This information, however, demands considerable interpretation by physicians because the MIC value must be compared with a table of achievable antimicrobial levels for different doses and sites of the body. It is now possible for a microprocessor to read an MIC value and compare it with a matrix of doses and body sites. A printout is then generated that clearly indicates whether a given antimicrobial is resistant, slightly sensitive, moderately sensitive or particularly sensitive for a given dose as well as a given site of the body.

The same microcomputer can provide microorganism identification in addition to reading an MIC and providing clinical interpretation. Various biochemical reactions can be determined in microtubes in the same plastic tray as an MIC determination. The reactions cause color changes in a battery of 21 to 27 biochemicals which form a profile or fingerprint characteristic of a given microorganism. Using observational probabilities stored in the memory of the computer, composite probabilities can be computed for each organism to an accuracy of one part in 4.3 billion. Results are then displayed and can be printed on the same form as the MIC results.

Microprocessor technology is expanding the capabilities of laboratory instruments to provide physicians with results that relate to known biochemical and pharmacological information.

RICHARD K. WERTZ, MD

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Screening for Alcoholism

IN VARIOUS HOSPITAL STUDIES, alcoholism was found in 3.7 percent to 9.9 percent of women and in 15.3 percent to 25 percent of men. In the general population, 5 percent to 10 percent probably have occasional problems with alcohol.

Five simple questions may alert the physician to alcoholism: "Do you drink?" If answer is no, ask "Could you tell me why?" This could reveal a temporarily abstinent problem drinker or alcoholic. If the answer is yes to drinking, ask "How (not why) do you drink?" This prevents the guarded or defensive reply, but gives a patient the opportunity to respond in any manner. Two further follow-up questions elicit problems associated with drinking. "Have you or close